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MARKET RESEARCH PROCESS IN HIGH-TECH MARKETS

Case Study: Development Process of BLOB gum eater™

Rok Omladic

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Abstract

This paper is concerned with the fast changing high-technology environment with the intention of offering step-by-step understanding of variables affecting product's or service's success on the market. To build a firm groundwork at the very beginning, company needs to draw a distinction between types of innovation, radical or incremental. Likewise firms have to adopt mindset of being not marketing oriented, but market oriented.

Main purpose of this thesis was to introduce an overview of the research tools high-tech marketers can use to explore their customers and demand on the market. Such tools can massively assist high-tech companies to collect a lot helpful information from the market and to get to know their potential customers and to understand their needs. To support the theoretical part, case study Development Process of BLOB gum eater was made. Study results show that companies should not stick to only one method they think should be the right one. Mix of methods brings desired results and product success on the market.

After all, thesis may help companies to realize that perfect product or service development under their definition does not dramatically raise the odds of success on the market if customer does not understand what the real added value is. Product or service is potentially successful if customer is able to recognize its value. Therefore, developers are committed besides realizing the idea also to consider customer needs and finally to incorporate it into the final product.

Keywords
high technology, market, market research, consumer, purchasing, research, analysis

Miscellaneous

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1 INTRODUCTION

Given the prominence of technological developments in our economy, categorizing particular industries as low- or high-tech may not be as easy as one would expect. Simply drawing a continuum ranging from low-tech industries on the one end to high-tech industries on the other and placing industries on the continuum based on common perceptions might, in fact, be misleading. Agriculture, heavy industry (steel mills, etc.) and services might not be as low tech as some might believe (Mohr, Sengupta & Slater 2005, 3).

Thesis begins with an introduction to the high-tech environment. The first chapter not only examines definitions of high-tech industries, but also shows that strategies have to be adapted to the type of innovation, radical or incremental. To successfully perform on the market, firms have to adopt mindset of being not marketing oriented, however market oriented.

Main goal of the thesis was to introduce an overview of the research tools high-tech marketers can use to explore their customers and demand on the market. Thesis is going to help high-tech companies to answer why the importance of research is crucial for product to survive on the market, which tools to use and why, and how to align suitable methods to the type of innovation.

To support the theoretical part, case study Development Process of BLOB gum eater was made. With this case study I wanted to explore step by step how companies develop new products, what kind of analytical approach they utilize, which are most common techniques and finally if using such approach is effective.

2 DEFINING HIGH TECH

If high tech is permeating even basic industries, just what is high tech? Is it an industry that produces technology? Or is it one that intensively uses technology? Just what is technology? Technology is the stock of relevant knowledge that allows new techniques to be derived and includes both product and process know-how. Product technology covers the ideas embodied in the product and its constituent components.

Process technology encompasses the ideas involved in the manufacture of a product (Capon & Glazer 1987, 1-14).

If technology is useful know-how, what, then, is high technology? There are nearly as many definitions of high tech as are people studying it. For example, one definition characterizes high-technology as (Technology, Innovation, and Regional Economic Development, 1982):

"engaged in the design, development, and introduction of new products and/or innovative manufacturing process through the systematic application of scientific and technical knowledge."

As shown in Figure 1, another view of high technology is based on common characteristics that all high-technology industries share, most notably, market uncertainty, technological uncertainty, and competitive volatility (Mohr et al. 2005, 6).

2.1 Market Uncertainty

Market uncertainty refers to ambiguity about the type and extent of customer needs that can be satisfied by a particular technology (Moriarty & Kosnik 1989, 7-17). There are five sources of market uncertainty. Market uncertainty arises first and foremost, from consumer fear, uncertainty, and doubt about what needs or problems the new technology will address, as well as how well it will meet those needs. Anxiety about these factors means that customers may delay adopting new innovations, require a high degree of education and information about the new innovation, and need post-purchase reassurance and reinforcement to assuage any lingering doubt. Second, customer needs may change rapidly, and in an unpredictable fashion, in high-tech environments. Third, customer anxiety is perpetuated by the lack of a clear standard for new innovations in a market. Fourth, due in large part to the prior three factors, uncertainty exists among both consumers and manufacturers over how fast the innovation will spread. Finally, uncertainty over how fast the innovation will spread contributes to an inability for manufacturers to estimate the size of the market (Mohr et al. 2005, 7).

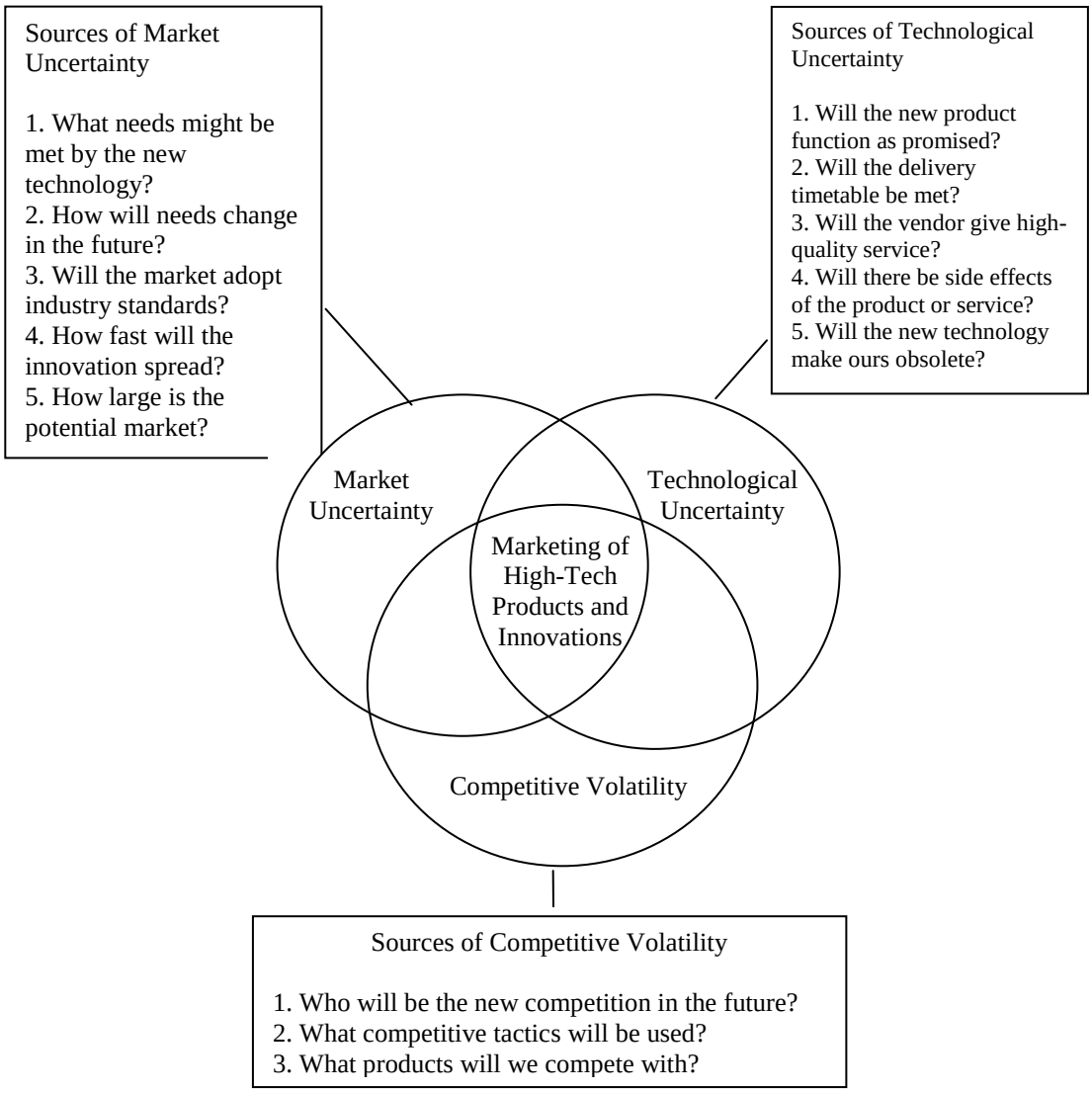

FIGURE 1. Characterizing High-Tech Marketing Environment. (Mohr et al. 2005, 6)

2.2 Technological Uncertainty

Technological uncertainty is “not knowing” whether the technology – or the company providing it – can deliver on its promise to meet specific needs (Moriarty & Kosnik 1989, 7-17). Mohr, Sengupta and Slater (2005, 9) continue by defining which factors give rise to technological uncertainty. The first comes from questions about whether the new innovation will function as promised. The second source of technological uncertainty relates to the timetable for availability of the new product. Third technological uncertainty arises from concerns about the supplier of new technology. Fourth, the very real concern over unanticipated consequences or side effects also creates technological uncertainty. Finally, in high-tech markets, technological uncertainty exists because one is never certain just how long the new technology will

be viable – before an even newer development makes it obsolete. As a new technology in introduced, its performance capacity improves slowly and then, because of heavy R&D efforts, improves tremendously, before reaching its performance limits.

2.3 Competitive Volatility

A third characteristic that underlies high-tech markets is competitive volatility. Competitive volatility refers to changes in the competitive landscape: which firms are one's competitors, their product offerings, the tools they use to compete. There are three sources of competitive volatility (Mohr et al. 2005, 10).

First, uncertainty over which firms will be new competitors in the future makes it difficult for firms to understand high-tech markets. Indeed, the majority of the time new technologies are commercialized by companies outside the threatened industry. These new players are viewed as disruptive and frequently dismissed by incumbents (Cooper & Schendel 1976, 61-69).

Second, new competitors that come from outside existing industry boundaries often bring their own set of competitive tactics, tactics with which existing industry incumbents may be unfamiliar. However, these new players end up rewriting the rules of the game, so to speak, and changing the face of the industry for all players (Hamel 1997, 70-84).

2.4 Radical/Breakthrough Innovations

Radical innovations are "so different that they cannot be compared to any existing practices or perceptions. They employ technologies and create new markets. Breakthroughs are conceptual shifts that make history," (Abernathy & Utterback 1978, 41-47). In standard marketing parlance, they are discontinuous innovations. Others refer to breakthrough innovations as revolutionary (Shanklin & Ryans 1984, 164-171), and they are developed in supply-side markets (Maney 1999, 164-171).

Supply-side markets are characterized by innovation-driven practice, in which a company's goal is to achieve profitable commercial applications for laboratory output; R&D is the prime mover behind marketing efforts, and specific commercial

applications or targets are considered only after the innovation is developed. For these reasons, these markets are sometimes referred to as “technology-push” situations (Mohr et al. 2005, 19). Most radical innovations are developed by R&D groups (in companies, in universities, in research laboratories), who often haven’t specifically thought about a particular commercial market application during the development process (Gross, Coy & Port 1995, 76-84). In other cases, radical innovations are developed as a new way to meet an existing need, or in response to the identification of an emerging need. Regardless of whether innovation originates from “pure” science or in response to a need, the new technology then creates a new market for itself. Competitive advantage for a breakthrough technology is based on the superior functional performance that the new innovation has to offer over the existing methods or products (Mohr et al. 2005, 20).

2.5 Incremental Innovations

Incremental innovations, on the other hand, are continuations of existing methods or practices and may involve extension of products already on the market; they are evolutionary as opposed to revolutionary. Both suppliers and customers have a clear conceptualization of the products and what they can do. Existing products are sufficiently close substitutes (Shanklin & Ryans 1984, 41-47). Incremental innovations occur in demand-side markets, in which product characteristics are well defined and customers can articulate their needs. In contrast to the view of the Internet as a radical innovation, some see it as an evolutionary innovation, “part of a continuum of technologies that drop the cost and improve the distribution of information,” comparable to he impact of television (Abernathy & Utterback 1978, 41-47).

In an industrial context (manufacturing applications), incremental innovations may be developed by producers of a mature product who have achieved high volume in their production process (Shanklin & Ryans 1984, 41-47). Hence, economies of scale may be very important, and pricing may be based on experience curve effects (costs decline by a fixed and known amount every time accumulated volume doubles) that arise from economies of scale and learning curves. Often, because the importance of scale economies to these firms innovations may take the form of production process innovations, which lower the costs of production. Competitive advantage is frequently

based on low-cost production. Firms whose bread-and-butter business comes from a specific product find that they may be less flexible to radical change and vulnerable to obsolescence. Some believe that marketing strategy for innovations is complicated by the fact that innovating firms might view an innovation as a breakthrough, whereas customers might view it as an incremental (or vice versa) (Mohr et al. 2005, 23).

2.6 Suppliers' and Customers' Different Perception of Innovation

Figure 2 highlights the four possibilities that can occur when considering both the suppliers' and customers' perception of the innovativeness of a new product. Obviously, when both parties' perceptions match, the path to marketing is fairly clear – as long as marketers understand that each type if innovations needs to be managed differently. However, when a firm views an innovation as incremental but customers see the innovation as a breakthrough (or vice versa) mistakes can happen (Kasturi & Bartus 1995, 63-75).

- Shadow products are developed in the shadow of other, more central products and are not central thrust of a firm's efforts.

Such innovations appear at the outset to offer a marginal contribution, and very few companies pay attention to marketing them proactively. Hence, such products tend to be marketed within the structure of the existing organization (existing brand manager, sales manager, and manufacturing line). Market segmentation and channel section, if anchored to existing solutions, are typically wrong, presenting a marketing mistake. The real market might be with new customers in new segments. Imagination and creativity may identify new problems the innovation could solve. Shadowed projects lack urgency and attention, which further undermines their potential odds of success (Kasturi & Bartus 1995, 63-75).

- Delusionary products are innovations where the suppliers have grandiose visions for the product but their customers do not share the same euphoria. These might be typical "lab" projects, wherein the technical team views the innovation as the "next best thing since sliced bread," but customers simply do not understand it or do not agree that it is so great (Kasturi & Bartus 1995, 63-75).

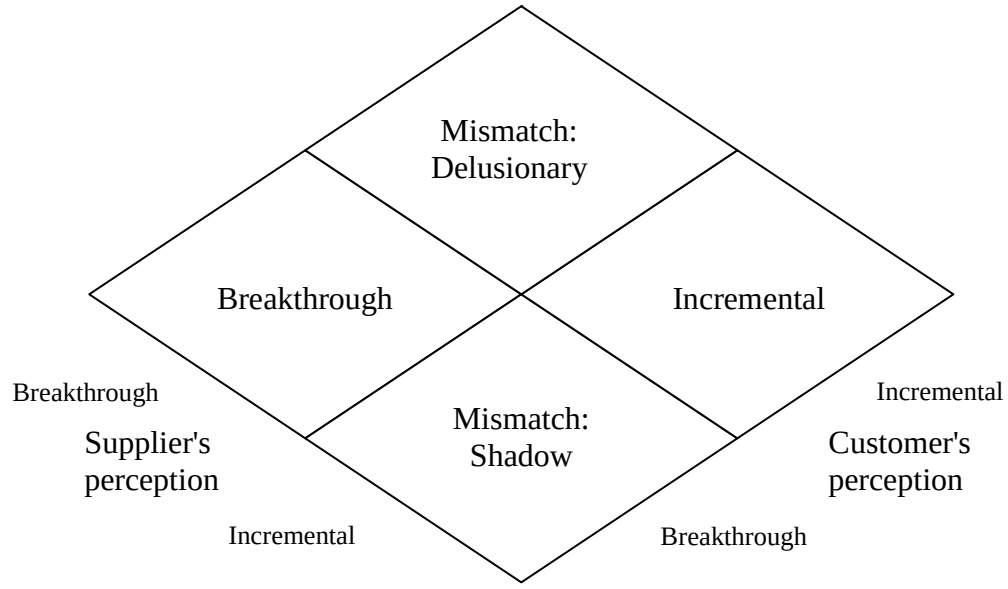

FIGURE 2. Supplier versus Customer Perceptions of Innovation. (Kasturi & Bartus 1995, 63-75.)

2.7 Does marketing needs to be different for high-technology products and innovations?

Moriarty and Rowland (1989, 18) discuss in their paper if it is clear that the nature of the marketing must be tailored to the type of innovation. But is high-tech marketing all that different from its low-tech counterpart? Or, will standard marketing tools suffice for high-tech markets? Are high-tech marketing disasters caused by the use of standard marketing approach, when a unique set of tools is necessary to handle the market, technological, and competitive uncertainties? Or, are high-tech marketing disasters merely the result of flawed execution of basic marketing?

Given the high degree of uncertainty, the margin for error for high-tech marketers is likely smaller than for conventional markets. In that sense, high-tech firms must execute basic marketing principles flawlessly (Gardner 1990, case: 90-1706).

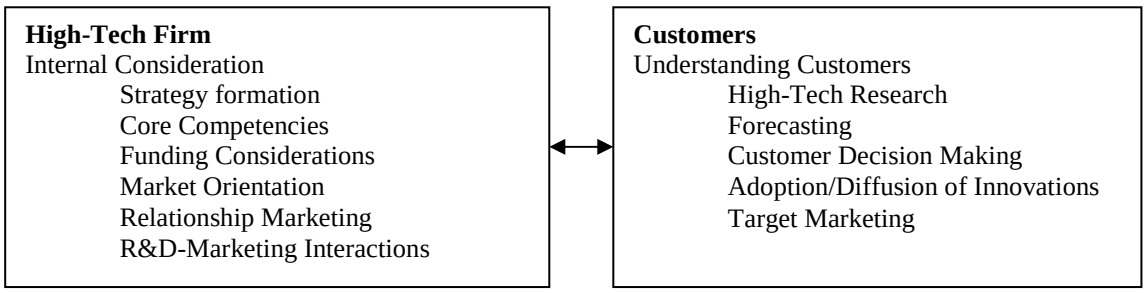

FIGURE 3. Framework for High-Tech Marketing Decisions. Mohr et al. 2005, 28)

Figure 3 provides the conceptual framework used for making high-technology marketing decisions. On the left side of the figure are the internal considerations that a firm must address and understand as the foundation to effective marketing. The management of high-tech firms has some unique considerations compared to management of traditional companies. Larger high-tech firms that begin to function as a corporate bureaucracy can struggle with how to remain innovative. Smaller high-tech firms wrestle with how to move from a technology-driven, engineering mindset to a market focus. For both sizes of firms, resolving conflicts between R&D and marketing is of paramount importance. Moreover, whereas all marketing is premised upon relationships, the management of relationships and strategic alliances often necessitate collaboration with competitors, where protection of intellectual property is even more important than traditional strategic alliances – particularly when the innovative firms are collaborating on cutting-edge research. On the right side of the figure are the customer considerations. One of the particularly challenging aspects of high-tech marketing is to understand customers and markets. For example, in conducting marketing research in high-tech industries, users often cannot articulate their needs very clearly because they simply cannot envision what the technology can do or how it can benefit from them (Mohr et al. 2005, 28-29).

3 MARKET ORIENTATION

Shapiro (1988, 119-225) states that it is important to note that a market orientation is not the same thing as a marketing orientation. A marketing orientation might imply that marketers have disproportionate influence or that marketing activities are the source of the firm's competitive advantage. On the other hand, in market-oriented firms, there is no consistently dominant function or coalition of individuals. In fact, any group may take the lead as long as its members are committed to the continuous

creation of superior customer value. And, while marketing activities may be source of competitive advantage, competitive advantage is just as likely to derive from market-focused skills in R&D or in product development. A firm cannot be fully market oriented if the entire organization is not committed to creating customer value.

As shown in Figure 4, a firm that is market oriented emphasizes the gathering dissemination, and utilization of market intelligence as the basis for decision making (Kohli & Jaworski, 1990, 1-18). Shapiro (1988, 119-225) continued that customer-oriented marketing activities are critical to gathering information to reduce overwhelming uncertainty over demand.

First, market oriented firms gather a wide array of information from the market. Market intelligence includes information about current and future customer needs, as well as competitive information and trends in the marketplace. The acquisition of information can be done via customer hit lines, trade shows, customer visits, working with lead users, competitive intelligence, or some of the more high-tech-oriented research tools (Shapiro, 1988, 119-225).

Gupta, Raj and Wilemon (1986, 7-17) continue that market oriented firm disseminates the information throughout the company, effective dissemination increases the value of information when each piece of information can be seen in its broader context by all organizational players who might be affected by or utilize it. People in the organization must be able to ask questions and augment or modify the information to provide new insights to the sender.

When organizations remove the functional barriers that impede the flow of information from development to manufacturing to sales and marketing, they improve the organization’s ability to make rapid decisions and to execute them effectively (Shapiro 1988, 119-225).

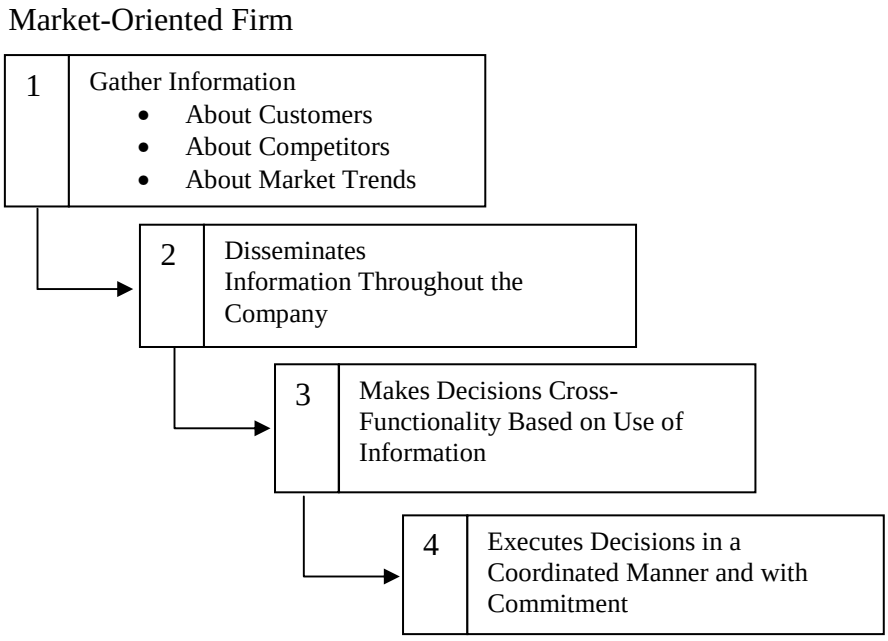

FIGURE 4. Market Orientation and R&D Interaction in High-Technology Firms. (Mohr et al. 2005, 111)

McQuarrie and McIntyre (1992, working paper: 92-114) define that another common approach to encourage information sharing in the development process is to send people from multiple functions on customer visits. Not only does this stimulate real-time information sharing, it generally increases the quality of the information gathered.

Third, market oriented firm uses the information to make decisions. To ensure that all information is considered before a decision is made, organizations must provide forums for information exchange and discussion. When decisions are made inter-functionally and inter-divisionally, greater representation of the information and a closer connection to the market issues will occur. Moreover, inter-functional decision making implies that the people who will be involved in implementing the decisions are the ones actually involved in making the decisions – the idea being that id one is involved in making the decision, he or she will be more committed to implementing that decision (Shapiro 1988, 119-225).

Finally, the market-oriented firm executes the decisions in a coordinated manner. Commitment to execution is necessary to successful implementation of a market orientation. An organization can generate and disseminate intelligence; however, unless it acts on that intelligence, nothing will be accomplished. Responsiveness to

market intelligence involves selection of target markets; development of products/services that address their current and anticipated needs; and production, distribution, and promotion of the products in a way that produces both customer satisfaction and customer loyalty (Kohli & Jaworski 1990, 1-18). All functions in a market-oriented company – not just marketing – participate in responding to market needs (Shapiro 1988, 119-225).

4 HIGH-TECH MARKETING RESEARCH TOOLS

High-tech environments are fraught with change and uncertainty. Customers have difficulty envisioning how technology can meet their needs. They are not aware of what new technologies are available of how those technologies might be used to solve current problems. They might not even be aware of the needs they have. Moreover, in this environment, firms must accelerate the product development process, closing the time between idea to market introduction. Successful firms in high-tech markets collect useful information to guide decisions (Mohr et al. 2005, 134).

As Figure 5 shows, research methods must be aligned with the type of innovation being developed (Leonard-Barton, Wilson & Doyle 1995, 281-305). This is consistent with the contingency theory of high-technology marketing. For incremental innovations, new-product developments are in alignment with the current market. Customer needs are generally known, and traditional marketing research can help companies understand such needs. Indeed, traditional marketing research techniques are most effective when a product or service is well understood by customers, or when the customer is familiar with possible solutions because of related experience in other contexts. Traditional marketing research tools may consult one of the many excellent resources available (Mohr et al. 2005, 134).

However authors Leonard-Barton, Wilson and Doyle (1995, 281-305) argue that standard marketing research tools typically do not address new uses or new benefits and less effective when customers are unfamiliar with the product being researched. Hence, for breakthrough products or for rapidly changing markets, standard where technical solutions might not provide useful information. In the extreme, where technical solutions precede customer needs, market research might consist largely of guided intuition. Industry experts may be helpful, and the creation of different future

scenarios can be used to guide decision making based on intuition.

In the midrange (between incremental and radical innovation), very useful techniques include customer visits, emphatic design, the lead user process, quality function deployment, and prototype testing. Figure 5 also depicts the flow of the chapter in that we first consider traditional tools of marketing research that are most appropriate for identifying opportunities for incremental innovation or for managing existing products. We then consider tools that may be useful for providing insight into opportunities for breakthrough innovations (Mohr et al. 2005, 135).

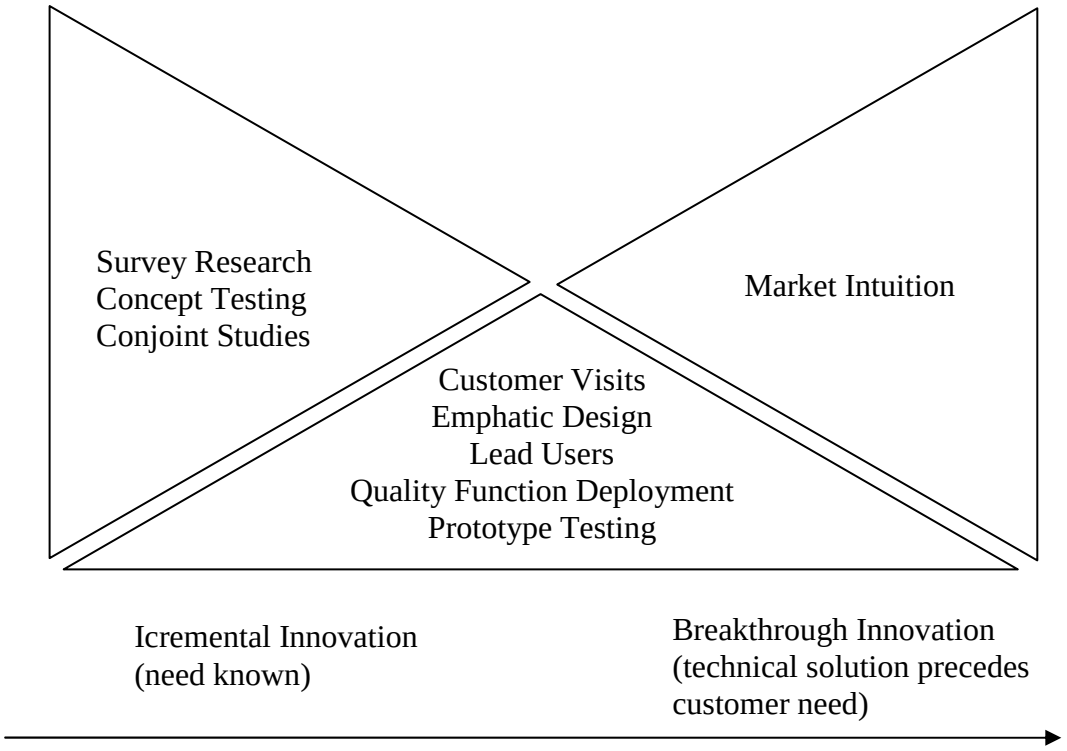

FIGURE 5. Aligning Market Research with Type of Innovation. (Leonard-Barton, Wilson & Doyle 1995, 281-305)

4.1 Concept testing

One of the more challenging decisions faced by a new product development (NPD) team is concept selection, the narrowing of multiple product concepts to a single, "best" product concept. The NPD process starts with the generation of ideas for a product that addresses an identified customer need. Many product concepts should be considered since only a small percentage of new product ideas ultimately prove to be profitable (Stevens & Burley 1997, 16-27). Also, keeping multiple product concept

options open and freezing the concept late in the development process affords the flexibility to respond to market – and technology shifts and many actually shorten total product development time (Iansiti 1995, 37-58). Mohr, Sengupta and Slater (2005, 135) continue that common approaches to idea generation include: the various observational techniques that I will discuss; brainstorming, where employees from engineering, marketing, sales, and manufacturing are guided through a series of creativity exercises to generate new product ideas; focus groups, where members of the target market are asked to think about how different product or service ideas could satisfy their needs; and depth interviews, where target customers participate in lengthy, nondirective, one-to-one interviews regarding their needs and potential solutions to those needs. Concept testing then evaluates these early-stage ideas and decides which of them are good enough to be developed further. These concepts are described in one or two paragraphs, sometimes with a name and a price, and potential customers are asked to rate them on dimensions such as interest in trying the product, purchase intent, uniqueness, and perceived value. The result can give the firm a better idea of customer interest, so the new product concept can be refined to improve its chances of success before going to a full-blown, predictive concept test. In the last stage, the number of concepts is reduced, based on the result from the previous stage, to a manageable set that can be thoroughly assessed. In this stage, a representative sample of potential customers is asked to view a small number of new product concept finalists and complete a battery of questions and diagnostic ratings.

4.2 Conjoint analysis

Author Mohr, Sengupta and Slater (2005, 136) describe conjoint analysis as how respondents are asked to make judgments about their preferences for combinations of product attributes, such as price, brand, speed, warranties, technical services, etc., that involve various levels such as high or low price, premium or value brand, and so forth. The basic objective is to determine the tradeoffs respondents are willing to make within the range of the attributes provided. For example, all other things being equal, a consumer may prefer to have a warranty, but is price sensitive. Conjoint analysis helps to infer whether, on average, consumers in the market would be willing to trade off a less extensive warranty for a lower price or whether the warranty is crucial, despite a slightly higher price. Conjoint analysis accomplishes this by estimating how much each attribute level is valued based on the choices that respondents make about

product concepts whose attributes are varied in a systematic way the value of conjoint analysis lies in the attention it gives to specifics of each product offering and how the various product features fit together to deliver a complete offering. One of the first steps in designing a conjoint study is to develop a set of attributes and levels of those attributes that adequately characterize the range of product options. Focus groups, customer interviews, and internal corporate expertise are some of the sources used to structure the sets of attributes and levels that guide the rest of the study. The analyst then develops a set of profiles that cover the full range of attribute levels specified in the study. Respondents than indicate their preference for each level of an attribute and the relative importance of each attribute. The results from this analysis are then used to make product development and positioning decisions.

4.3 Customer Visit Programs

Mohr, Sengupta and Slater (2005, 136) define customer visit program or a systematic program of visiting customers with a cross-functional team to understand customer needs, when implemented correctly, can also lead to significant insights and benefits for high-tech marketers. The idea of using customer visits for market research has developed in response to the challenges faced by managers in many industries. Customer visits are more than a tool to groom customer relationships; they offer a variety of benefits, including the following:

1. **Face-to-face communication.** Development of new-to-the-world products benefits from the unique capacity of personal communication to facilitate the transfer of complex, ambiguous, and novel information.
2. **Field research.** Doing research at the customer's place of business allows personnel to see the product in use, talk to actual users of the product, and gain a better understanding of the product's role in the customer's total operation.
3. **Firsthand knowledge.** Everyone believes his or her own eyes and ears first. When key players hear about problems and needs from the most credible source – the customers – responsiveness is enhanced.
4. **Interactive conversation.** The ability to clarify, follow up, switch gears, and address surprising and unexpected insights provides depth to interactions.
5. **Inclusion of multiple decision makers.** Many technology products are purchased by groups of people, and customer visits allow all of the players'

various needs and desires to be addressed.

To realize these advantages, customer visits are much more than merely talking to people. Good customer visit programs can reveal new pieces of information that may have a direct impact on products or services offered to customers (Mohr et al. 2005, 136):

1. **Get engineers in front of customers.** It is vital that cross-functional teams participate in the customer visit program. Relying solely on marketing personnel to conduct customer visits makes cross-functional collaboration unlikely and marketing may lack credibility with key technical people. The people who participate in the visits must be the ones who will use the information. Teams should include, at a minimum, an engineer, a product-marketing representative, and the account manager. For cross-functional teams to work smoothly in customer visits, good teamwork must exist between engineering and marketing.

For a customer visit program to be successful, it must be part of the corporate culture and enthusiastically embraced by the technical team. R&D managers who say, “Go see the customers yourself,” or “Take the project team out to visit customers” are vital to communicating the appropriate attitude. Having only marketers go out to visit customers does not substitute for a commitment on the part of the entire organization to understand customers. Finally, having only-level executives on customer visits makes other company personnel question the degree to which customer focus is real or just window dressing.

2. **Visit different kinds of customers.** Ideally, team should visit multiple customers to get more than just an idiosyncratic reading on customer needs. The common tendency in customer visit programs is to visit only national accounts. Although visiting national accounts may result in increasing satisfaction with these accounts, market share may shrink if the firm falls into the trap of developing products that exactly suit an ever-smaller number of customers. Often the freshest perspectives and greatest surprises come from atypical sources, such as competitors’ customers, global customers, lost leads, lead users, distribution channel members, or “internal” customers of the firm’s

own field staff. Customer councils are another important source of information. They are typically designed to get feedback, share perspectives, and build stronger customer relationships. They offer the potential of synergy through group action.

3. **Get out of the conference room.** Because customers often don't realize and cannot vocalize specific needs, it is important to listen and observe what they do. This is especially important for companies that tend to invite customers to their own premises. When a firm hosts its customers' visits on the premises, the visits tend to take place in the company's visit center. Such a policy may cut costs and save time in the customer visit program, but it puts the customers in a passive role; the company is typically show-casing its products and giving VIP treatment to customers.

4. **Take every opportunity to ask questions.** Customer visit programs are useful not only for new-product development ideas but also for customer satisfaction studies, identification of new market segments, and a myriad of other issues. Interesting questions to ask include:

- If you change any one thing about this product, what would it be?
- What aspects of your business are keeping you awake at night?
- What things do we do particularly well or poorly, relative to our competition?
- What things do we do particularly well or poorly, relative to our expectations?

5. **Conduct programmatic visits.** A systematic approach including between 15 and 40 visits will yield a depth of understanding an illumination that can go well beyond what a few scattered visits can offer. It is important to coordinate the visits so that customers are not confused and irritated by a series of haphazard visits from different divisions and levels in the firm. Promptly log and review customer visits in a central database. Reviewing all profiles that are kept in a central database allows firm to spot trends, define segments, identify problems and glimpse opportunities (McQuarrie 1995, 9-21).

4.4 Emphatic Design

The process of using emphatic design tools is very similar in flavor to the notion of customer visits. Being market oriented in high-tech markets means that observation of customers (what they do) is often more useful in developing novel insights than is asking customers more direct questions (what they say). Emphatic design, or contextual inquiry in Microsoft's terminology, is a research technique based on the idea that users may not be able to articulate their needs clearly. It focuses on understanding user needs through empathy with the user world, rather than from users' direct articulation of their needs. For example, users may have developed "workarounds" – modifications to usage situations that are inconvenient yet so habitual that users are not even conscious of them. Or customers may not be able to envision the ways new technology could be used. Based in anthropology and ethnography, emphatic design allows the marketer to develop a deep understanding of the current user environment, to extrapolate the evolution of that environment into the future, and to imagine the future need that technology can satisfy (Leonard-Barton & Rayport 1997, 102-113).

4.4.1 Process to Conduct Emphatic Design

Leonard-Barton and Rayport (1997, 102-113) offer a five-step process to conducting emphatic design.

1. **Observation.** At the first step of undertaking an emphatic design study, researchers should clarify the following:
    - **Who should be observed?** Although "customers" is a logical answer, often non-customers, customers of customers, or a group of individuals who collectively perform a task may provide useful information.
    - **Who should do the observing?** Differences in perception and background lead different people to notice very different details when observing the same situation. Hence, it is best to use a small cross-disciplinary team to conduct observational studies. Members should be open-minded and curious, and they should understand the value of observation. For this reason, hiring trained ethnographers to assist in the study is useful. Moreover, those who know the capabilities of a

particular technology are often not the ones who are in contact with the customer (who knows what needs to be done). Hence, the process of conducting emphatic design requires cross-functional collaboration between marketing and R&D.

- **What behavior should be observed?** It is important to observe the "subjects" in as normal an environment as possible. Although some believe that observation changes people's behavior (which is probably unavoidable), some alternatives to observation are experiments in highly artificial lab settings or focus groups, both of which also have limitations. The idea here is to gather new kinds of insights that other research techniques cannot.

2. **Capture the data.** At the second step of the emphatic design process, researchers need to establish how to record the information. Most data from emphatic design projects are gathered from visual, auditory, and sensory cues. Hence, photographs and video graphs can be useful tools that capture information lost in verbal descriptions, such as spatial arrangements.

Whereas standard research techniques may rely on a sequence of questioning, emphatic design asks very few questions other than to explore, in a very open-ended fashion, why people are doing things. Researchers may want to know what problems the user is encountering in the course of the observed activity.

3. **Reflection and analysis.** At the third step, the different team members and other colleagues review the team's observations contained in the captured data. The purpose is to identify all of the customers' possible problems and needs.

4. **Brainstorm for solutions.** At the fourth step, brainstorming is used to transform observations into ideas for solutions.

5. **Develop prototypes of possible solutions.** At the fifth, researchers need to consider more concretely how possible solutions might be implemented. The more radical an innovation, the harder it is to understand how it should look and function. Researchers can stimulate useful communication by creating some prototype of the idea. Such prototypes, because of their concreteness, can

clarify the concept for the development team, allow insights from others who weren't on the team, and stimulate reaction and discussion with potential customers. Simulations and role playing can be useful prototypes when tangible representations of the product cannot be made.

4.5 Lead Users

Another research technique helpful in high-tech environments is the lead user process. Used to generate ideas for breakthrough innovations, the lead user process collects information about both needs and solutions from the leading edges of a company's target market and from markets that face similar problems in a more extreme form. The types of customers that tend to innovate are lead users – customers that are well ahead of market trends and have needs that go far beyond those of the average user (von Hippel 1986, 791-805).

Lead user may face needs months or years before the bulk of the marketplace and, as such, are positioned to benefit significantly by obtaining solutions to those needs now. In some cases, lead users may have even developed a solution to their needs that marketers can then commercialize for other users (von Hippel 1978, 3-11).

Eric von Hippel (1986, 791-805) advocates the use of a four-step process to incorporate lead users into marketing research. The process is conducted by a cross-disciplinary team that includes marketing and technical departments. The process can be time-consuming with each step taking about four to six weeks, and the entire process four to six months.

1. **Identify important market/technical trends.** Lead users are defined as being in advance of the market with respect to an important dimension, which is changing over time. Therefore, before one can identify lead users, one must identify the underlying trend on which these users have a leading position. "One cannot specify what the leading edge of a target market might be without first understanding the major trends in the heart of the market".

2. **Identify and question lead users.** Customers who are affected early on by significant trends often face product and process needs sooner than do others

in a market. As such, they may be positioned to realize a relatively higher benefit from solutions to those needs than are others. In business-to-business markets, manufacturers typically have a better understanding of their key customers than may be possible in consumer markets. Hence, personal knowledge of customers may identify lead users, whereas survey may be used to identify lead users in consumer goods industries. A very practical method for identifying lead users involves identifying those users who are actively innovating to solve problems present at the leading edge of a trend.

3. **Develop the breakthroughs.** The team may begin this phase by hosting a workshop that includes several lead users who have a range of expertise, as well as a number of representatives from different areas of the company (marketing, engineering, manufacturing, etc.). During the workshop, the group combines insights and experiences to provide ideas for the sponsoring company's needs.

4. **Project the lead user data onto the larger market.** One cannot assume that today's lead users are similar to the users who make up the major share of tomorrow's market. Firms must assess how lead user data will apply to more typical users rather than simply assume such data transfer in a straightforward fashion. Prototyping the solution and asking a sample of typical users to use it is one way to gather data to make the projection. Based on a determination of how the new concept fits the needs of a larger target market, the team will present its recommendations to senior managers. This presentation will include evidence about why customers would be willing to pay for the new products.

4.6 Prototype Testing

A prototype testing is a model of the ultimate product or service. As a model, the prototype may provide only the essential elements of the planned final product while ignoring minor or purely supporting elements. The first test in prototype testing is against the technical design specifications. If the prototype does not meet specifications, appropriate adjustments are made. When it does meet specifications, the prototype is then evaluated by potential customers (Mohr et al. 2005, 151-152).

4.7 Gathering Competitive Intelligence

Another vital element in the information arsenal for the high-tech marketer is competitive intelligence. Competitive intelligence is information about competitors: who they are, their products, their marketing strategies, and likely responses to the marketing strategies of other firms in the market. Effective competitive intelligence provides solid knowledge of the market, customers, and competitors; quick response time; and superior strategy based on identification of threats and opportunities. Competitive intelligence provides firms with an early warning system to ward off disasters. Indeed, “the essence of smart competitive management is an action that preceded its obvious time,” (Gilad 1995, 32-36).

For competitive intelligence programs to work, they must affect the mindset and decisions of the people whose actions most significantly affect the bottom line – namely, top management. Moreover, effective competitive intelligence programs are much more than mere passive watching of the market (i.e., competitive monitoring); rather, firms that are skilled at reading signals from the market actually develop a core competency in understanding the competition. To do so, they must find it safe to challenge the status quo, to bring an outside perspective, and to be unconventional. It can be difficult to gather competitive intelligence in high-tech markets. Sometimes one does not think to look outside the industry for competition. As a result, firms must monitor related industries for competitive moves (Mohr et al. 2005, 153).

The flipside of gathering competitive intelligence is sending competitive signals. Indeed, some firms proactively attempt to send signals to competitors in the marketplace via a variety of mechanisms (Mohr 1996, 245-268). Mohr, Sengupta and Slater (2005, 156) then continue in another work with an example, pre-announcing of products, or the announcement of a firm’s intention to release a product in the future, is commonly used and can preempt competitors by postponing customers’ buying decisions. Firms can send competitive signals by sharing information within industry contacts, customers, or distributors; the information will eventually be disseminated to others.

4.8 Forecasting Customer Demand

Forecasting future sales of high-tech products is difficult for many reasons. Quantitative methods typically rely on historical data, but for radically new products, there are no historical data. Moreover, data obtained through traditional techniques are of dubious value, because it is difficult for customers to articulate their preferences and expectations when they have no basis for understanding the new technology. Forecasting tools can be categorized into quantitative and qualitative tools. Basic quantitative tools include moving averages, exponential smoothing, and regression analysis. As noted previously, because of their reliance on historical data – which are often nonexistent in a new high-tech marketplace – quantitative methods may not be available in high-tech markets. Qualitative forecasting methods, such as the Delphi and morphological methods may be more applicable (Mohr et al. 2005, 157).

The Delphi method is probably the most common qualitative method. In this technique, a panel of experts is convened and asked to address specific questions, such as when a new product will gain widespread acceptance. These experts are purposefully kept separate, so that their judgments will not be influenced by social pressures or group influences. The answers to initial questions are sent back to the participants, who are asked to refine their own judgments and to comment on the predictions of the others, in an attempt to find consensus. Anonymity among the panel members allows for open debate (Mohr et al. 2005, 157).

Mohr argues (2005, 137) this method does have limitations, including lack of reliability assessment and potential sensitivity to the experts selected; such limitations also apply – possibly even more so – to other subjective estimates. Selection of the experts also warrants careful attention. Experts from the industry in general, including lead users, can offer their knowledge as a useful benchmark against the estimates generated internally by a firm. Another useful forecasting tool in high-tech markets relies on analogous data to make inferences about the new technology. The basic idea is to use data about another product currently on the market, or one that existed at an earlier time, to forecast a new product’s expected growth pattern. This technique is valid only to the extent that the analogy holds true. The degree to which the analogy is appropriate depends on the logical connection between the products involved.

Additional techniques might also be useful in making forecast for high-technology products. The information acceleration (IA) technique relies on a virtual representation of a new product to assist in product development and forecasting (Urban, Hauser, Qualls, Weinberg, Bohlmann & Chicos 1997, 143-153). Such representations are more vivid and realistic than are traditional concept descriptions and less expensive than relying on actual prototypes. Hence, they provide a useful middle ground between traditional concept descriptions and actual physical prototypes. Feedback from customers is obtained through the use of the virtual representation of the new-product idea (Mohr et al. 2005, 158).

4.9 Other Considerations in Forecasting

Whichever forecast method or combination of methods is used, the forecasters must ensure that bias does not enter into the forecast due to personal or organizational desires of success for the technology. Stakeholders in new technology often inflate predictions of its future success, and "since their bullish statements of technical potential are often misleadingly packaged as precise market forecasts, unwary businesses and investors often suffer." Marketing researchers can avoid bias by studying a new technology's potential buyers, who have less of a stake in its success. However, this is typically not done due to the fact that the group of potential customers can be difficult to reach, making accurate market research expensive and time-consuming (Brody 1991, 38).

Many times, decision makers are less than confident in the prepared forecast for a certain technology, and this lack of confidence can sometimes lead to indecisiveness or bad decisions. Although forecasting demand for new technologies is difficult, it is often critical to provide information to decision makers. Forecaster should keep in mind that success of the forecast is nor based on whether it comes true, but on quality of information provided to the decision makers who are the end users of the forecast (Mohr et al. 2005, 159).

5 CASE: BLOB gum eater ™

5.1 Research Method

There are a few types of interviewing styles to choose from: structured interviews, semi-structured interviews, and unstructured interviews. As may be evident, structured interviews involve asking the same set of questions to each research participant. There is no room to move beyond the set of questions. This style of interview is often used in conducting surveys. In qualitative research, the structured interview is quite limiting. Semi-structured interviews allow for more flexibility. They involve having a set of guiding questions that will keep the interview on track. However, the researcher can follow topics of interest during the interview without having to adhere to a structured set of questions. For unstructured interviews, the researcher will have an idea of the avenues he/she wants to explore, but the interview is more like a conversation—flexible and unrestricted. Because the conversation can, and is expected, to go anywhere, comparing data between interviews becomes more difficult (Wilson, 2012, 96).

As discussed above, most appropriate way of interviewing open topic subject is semi-structured type of an interview. In my case, such type has been used with company owner Mr. Peter Sedej. I asked following questions which answers result in sections 5.2 and 5.3.:

- What is BLOB?
- How the idea of designing BLOB was born?
- What is its purpose?
- Who is BLOB's final user?
- Where did you look for information about disposal of gums?
- Which method was used to get information on the situation of gum and table trash disposal in bars and restaurants?
- What did you discover?
- Which problems did you identify?
- How did the discoveries affect further product development?
- Based on discoveries, how did you prepare prototypes?
- Which criteria were used to test prototypes?

- How did you measure user's feedback?

5.2 About BLOB

New times create new needs. And new needs create new inventions. Nowadays it has become forbidden to smoke in bars, let alone offices. It's a known fact that many smokers therefore decide to switch to a healthier option, such as the consumption of chewing gum. Consequently, the birth of this new invention, called BLOB Gum eater™, makes perfect sense.

FIGURE 6. BLOB Gum eater™

This is a tabletop bin or, considering the implications behind its name, a "devourer" of chewing gum, designed to eliminate the uncomfortable moment when we wish to dispose our chewing gum, sugar wrapping, tea bag or other small trash but can't find any suitable place on the table without an ashtray. This innovation enables a trouble-free disposal. It's a desktop cube with chewing gum repellent interior and an exterior large enough to be branded with any commercial message.

BLOB Gum eater™ is a container for disposable chewing gum and other table trash. It is complicated by design but generous with results since its high-tech structure prevents sticking and thus enables easy cleaning of the container. It has appealing design, one that calls for touching and using. Use is simple and intuitively logical – you just have to squeeze it with your fingers and its »mouths« will open.

5.3 Research process

Information on researching process for development of BLOB Gum eater™ was collected with an interview with the owner of the company Blob d.o.o. Mr. Peter

Sedej. His main idea was to create a new and innovative advertising space for food & beverage industry through minimization of unwanted practices of gum and table trash disposal. Final product should offer:

- is an attention grabbing advertising medium for point of sale promotion
- present a handy and reserved approach to reach consumers
- attract draw customers' attention
- ad on the product stimulates decision making and induces strong compulsive purchase
- lures consumers into advertised brand by integrating message in their daily practices

At the first step of researching his team focused on the situation of gum and table trash disposal in bars and restaurants by simply observing daily situation employees face. They discovered that existing ways of gum and table trash disposal are generally problematic:

- Smokers unhappy with full ashtrays
- Staff unhappy with gum removal from ashtrays
- Customers unhappy with sight of disposed gum
- Stronger gum disposal issue in countries with banned indoor smoking
- No ashtrays on tables
- Gum is often disposed in various other inappropriate places (e.g. on the floor, underneath tables, chairs and various other objects, etc.)

Based on the information of daily problems, gathered in real-life, directives of designing a product were following:

- tidy arrangement of tables and general cleanliness
- the winds no longer blow the paper wrappings off the tables
- it spares the staff with unpleasant and inconvenient task of gum removal
- savings of time consumption, previously used for gum removal from inappropriate places and objects
- guests no longer have to worry about disposing the chewing gums and other table trash properly
- smokers are pleased for the ashtrays no longer contain the chewing gums, wrappings or handkerchiefs

The next step in product development was to prepare prototypes. Prototypes enable researches physical example of the idea. Blob d.o.o. prepared three options of the product:

OPTION A	OPTION B	OPTION C
		

FIGURE 7. Blob prototype options

Each option got tested in local bars and restaurants under following criteria's:

- Blob table basket is a practical solution for the disposal of chewing gums.
- Due to the use of BLOB table baskets the disposal of chewing gums in coffee shops is more discrete and hygienic.
- Due to the use of BLOB table baskets the use of secondary disposal places will be less frequent.

Out of three options, option A received most positive feedback. Method used to get these result was a questionnaire (Appendix 1.) filled out by employees from bars and restaurants where BLOB was being tested.

5.4 Review

BLOB Gum eater™ is not an innovation with its target audience since BLOB lures consumers into advertisers brand by integrating their message in their daily practices (people use BLOB while relaxing in their favorite bar, club or restaurant).
Advantages that BLOB offers to final users:

- Users will feel comfortable about disposing the chewing gums and other table trash properly

Advantages that BLOB offers to advertisers:

- Ensure effective targeted advertising right on the spot

- Due to instant purchase impulse customers will more often select advertised product
- BLOB presents cost effective investment in point of sale advertising

Research process cannot be defined under one specific method, but it is a mix between more of them. In some way it could defined as Emphatic design, because it is based on understanding user needs through observation. On the other hand product was tested in real life which means that one step in product development was being part of Prototype testing method. Finally, to decide which option is most appropriate, a simple analysis of traditional questionnaire was enough for Blob d.o.o. to know in which direction finalization of the project should go.

6 DISCUSSION

How to characterize high-technology environment, which are the sources that have crucial impact? Market uncertainty is the first source and defines environments customer, do they actually exist or if there is potential market for the product or innovation. Next source technological uncertainty refers to vagueness if the technology is able to function as promised and meet customer needs. The last one competitive volatility defines firms' competitive environment. Furthermore, to attract customers a firm has to be aware of the type of innovation, radical or incremental, and be able to tailor marketing to the type of innovation.

Effective R&D-marketing interaction and being market oriented is another vital factor on firms' performance. To begin with, firms has to gather information from the market, communicate it through the company, consider gathered information when making decisions and finally decision is made in coordinated way.

Uncertainty is in high-tech markets a key point on the road to success. Final customers are the main target when selling product or service that is why firms have to besides developing product or service, concentrate also on customer. To continue with, in high-tech markets it is difficult to imagine what is the purpose of the new technology if customer aren't acquainted how to use it. It is most likely they are not even aware of needs they have. To avoid those problems, a firm has to cautiously collect information

from the market. Not only on competitors, marketers have to cautiously work on gathering information on customers, how they behave, why so, and incorporate them in the development process. Unsatisfied customer can jeopardize firms' success that is why companies have to work hard to get familiar with their psychology and their habits.

There has always existed a clash in the mindset of technical people and users, who are in fact customers. On the one hand technical people usually do not understand users, on the other hand users usually do not understand language of technical people. This gap or clash could be avoided or reduced by using high-tech research tools. Companies have to realize that perfect product or service development under their definition does not dramatically raise the odds of market success if customer does not know what the real added value is. Product or service is potentially successful is customer is able to recognize its value. Therefore, developers are committed besides realizing the idea also to consider customer needs and finally to incorporate it into the final product.

After all, success determines on two main success drivers:

- what kind of information is collected
- from who information is being collected from

Proper interpretation of results could bring firms' to a higher level meaning steeply raise the odds of success on the market. For recognizing success drivers, firms should consider research techniques presented in Table 2.

To back up theory, case study Development Process of BLOB gum eater shows practical approach to product development, understanding market and customers (users). As presented in theory with Chapters 2-4, in reality Blob's d.o.o developer's behavior was totally market oriented. Product was being developed accordingly to market research feedback. Market intelligence had major impact which direction product should take. For example, at the stage of prototype testing, developers tested all options, and then they measured feedback from users with questionnaires to be sure which type has most chances to succeed. What I have learned from this case is that research process cannot be defined under one specific method, but it is a mix between more of them.

TABLE 1. Research techniques. (Mohr et al. 2005, 160-161)

Concept testing	The process of evaluating early stage-ideas to determine which of them are good enough to be developed further.
Conjoint analysis	A market research tool in which respondents are asked to make judgments about their preferences for combinations of product attributes; statistical tool are the used to estimate how much each attribute is valued and to use this information in the product design process.
Customer visit program	A systematic program of visiting customers with a cross-functional team to understand the customers' needs how they use products, and their environment.
Emphatic design	A research technique based on understanding user needs through observation of the customer, rather than through traditional questioning methods (focus groups, surveys)
Lead users	Customers who face needs months or years before the bulk of the marketplace and are positioned to benefit significantly by obtaining solutions to those needs now. In some cases, lead users may have even developed a solution to their needs that marketers can then commercialize for other users.
Prototype testing	The evaluation of a model of the desired product that replicates the product's critical features while ignoring non-critical features. The first test of a prototype is whether it meets technical specifications. The second test compares the prototype to customer expectations.
Competitive intelligence	The gathering of information about competitors (who they are, their products, their marketing strategies, and likely responses to the marketing strategies of other firms in the market).

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APPENDICES

Appendix 1. - Questionnaire for coffee shop owners

Date of questionnaire: __. __.2010

BLOB™

Questionnaire for coffee shop owners

Please, take a minute of your time and fill out the following questionnaire. As we wish to make our product even better in the future and adjust it according to your wishes and needs, your opinion will be very valuable for us.

❖ **First, please, state some basic data**

Name of coffee shop _____

Location/Address_____

No. of tables in coffee shop: _____ No. of BLOB™ table baskets:_____

Date of placement of BLOB™ baskets: __. __ .2010

QUESTIONNAIRE

1. **Has the disposal of chewing gums in ashtrays been reduced due to the use of BLOB™?** (Encircle accordingly)

   Yes / No

   If you encircled YES, please, state the percentage of the reduction. (Encircle accordingly)

Less than 20%	Between 21% and 40%	Between 41% and 60%	Between 61% and 80%	More than 80%

2. **Has the disposal of chewing gums for example under the edges of tables and chairs, on coffee plates or other places/objects been reduced due to the use of BLOB™?** (Encircle accordingly)

   Yes / No

   If you encircled YES, please, state the percentage of the reduction. (Encircle accordingly)

Less than 20%	Between 21% and 40%	Between 41% and 60%	Between 61% and 80%	More than 80%

3. **Do you see the use of BLOB™ baskets as a saving of time which you would normally spent on disposing chewing gums from various objects?** (Encircle accordingly)

☐ No ☐ Little ☐ Medium ☐ Great deal ☐ Tremendous

4. **Do you believe that the satisfaction of your guests has increased due to the use of BLOB™ table baskets?** (Encircle accordingly)

☐ No ☐ Little ☐ Medium ☐ Great deal ☐ Tremendous

5. **Please, evaluate your satisfaction with the use of BLOB™ basket.**

Use the scale from 1 to 5, 1 being *the least satisfied* and 5 *very satisfied.*

Content	*Evaluation*	
Practicality of emptying	1 2 3 4 5	Don't know
Cleaning the BLOB™ basket	1 2 3 4 5	Don't know
Size of BLOB™ basket (compared to other objects on the table)	1 2 3 4 5	Don't know

6. **Have you had any problems with the use of BLOB™ table baskets?** (Encircle accordingly)

Yes / No

Please, describe:

_____

_____

7. **Do you believe that the purpose of BLOB™ table basket was clear to your guests?** (Encircle accordingly)

Yes / No

8. **After the placement of BLOB™ table baskets have you noticed an increase in the sale of the chewing gum advertised on the basket?** (Encircle accordingly)

Yes / No Up to what percentage:_____%

9. **How many BLOB™ table baskets have been stolen?** Please, state the number.

_____ pcs

10. **Would you recommend the use of BLOB™ table baskets to other coffee shop owners?** (Encircle accordingly)

Yes / No

11. **Comments, suggestions …**

Thank you very much for your cooperation!